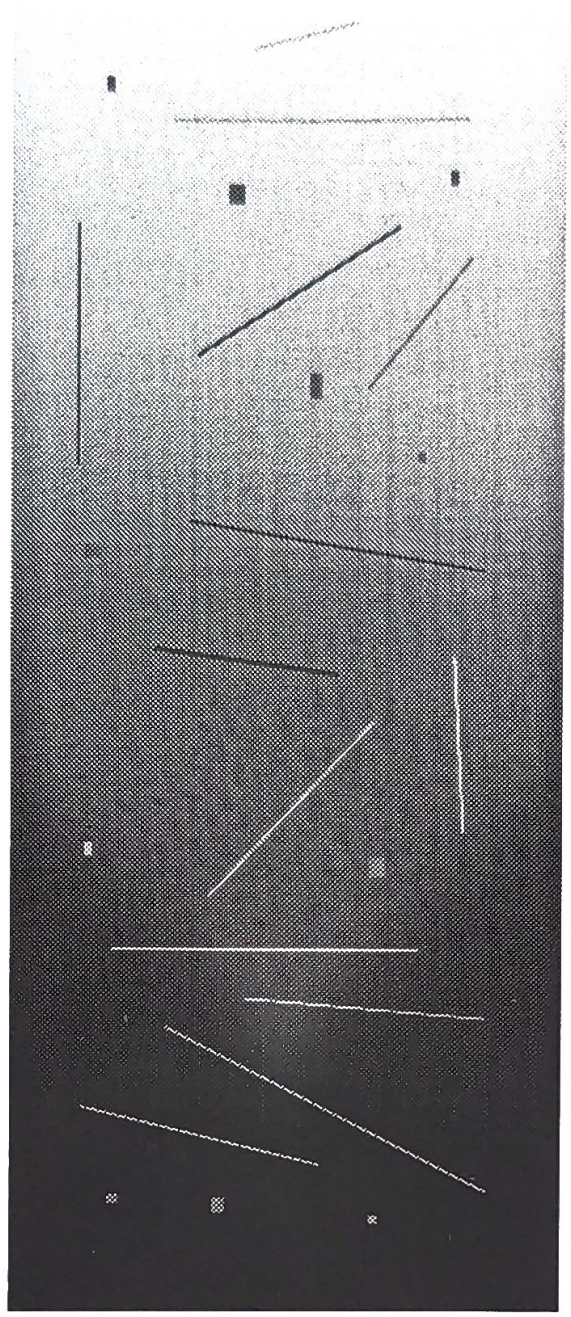
# Tandy 2100



*User's Guide*

TANDY

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10 9 8 7 6 5 4 3 2 1

**For technical support, call (817) 878-6875.**

### The FCC wants you to know...

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of *FCC Rules*. These limits are designed to provide reasonable protection against harmful radio and TV interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed in accordance with the instructions, may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation.

If this equipment does interfere with radio or television reception, which you can tell by turning the equipment off and on, you are encouraged to try to correct the interference. Use one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and the radio/TV.
- Connect the equipment to an outlet that is on a different circuit from the one used for the radio/TV.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded cables must be used with this equipment. If you add or replace any cables, the new cables must have shielding capabilities equal to or higher than those provided by the dealer.

Modifying or tampering with internal components can cause a malfunction and might invalidate the warranty and void your FCC authorization to operate this equipment.

### The DOC wants you to know...

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

### Le Ministère des Communications du Canada vous informe que...

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class B prescrites dans le Réglement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

# About Your Computer

Your computer offers the following features:

- 80486SX PQFP microprocessor, 25MHz
- 4MB system memory
- support for up to 32MB system memory
- IDE hard disk drive
- support for additional IDE drive
- 3½-inch 1.44MB diskette drive
- three available 5¼-inch drive bays
- two serial ports
- one parallel port
- one game port
- three available 16-bit expansion adapter slots
- one available 8-bit expansion adapter slot
- Hercules, MDA, CGA, EGA, and VGA compatible video
- Windows accelerator video circuitry
- support for non-interlaced or interlaced monitors
- support for multi-sync and PS/2 monitors
- 1024 x 768 70 Hz refresh option
- 512KB video memory
- support for 1MB video memory
- switchable power supply:
  - 110-125V, 4.0 A max., 60 Hz
  - 220-240V, 2.0 A max., 50/60 Hz
- turbo button for two CPU clock speed settings: 25MHz, noted by indicator light, and 12MHz (for older software applications)

## Setting Up Your System

➢ **Caution:** Place the computer near a properly grounded, easily accessible AC outlet. To ensure that the unit is adequately ventilated, position the keyboard and any peripherals at least 2 inches from the vents. Do not block the sides, front, or back of the computer.

Follow these steps to set up your computer:

1. The voltage selector switch on the back panel enables you to set the computer for connection to a 110-120V AC or 220-240V AC outlet. If necessary, use a pen or similar object to change the setting of the voltage selector switch on the back panel.

2. Read the following information before connecting the power cord to the computer:

   - Do not use an outlet that powers heavy machinery such as copiers and office machines. If you must use an extension cord, use a grounded, multiple-outlet power strip. The combined length of the power and extension cords must not exceed the maximum length specified below.
   - **For a 115V power source:** Use a UL/CSA-listed cord set consisting of a minimum 18 AWG, type SVT or SJT three-conductor cord a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 10A, 125V. The power cord included with the computer meets these requirements.
   - **For a 230V power source inside North America:** Use a UL/CSA-listed cord set consisting of a minimum 18 AWG, type SVT or SJT three-conductor cord a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 10A, 250V.

- **For a 230V power source outside North America:** Use a cord set consisting of a minimum 0.75 mm cord and grounding-type attachment plug rated 10A, 250V. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed and should be marked HAR.

3. Connect the power cord, keyboard, mouse, and monitor.

## System Setup

To run properly, the computer requires information about connected devices and installed options. The computer stores this *system configuration* information and the system date and time in CMOS RAM. The setup utility lets you review and update the information stored in CMOS RAM.

If you revise the default settings, you can restore the previous settings displayed by pressing **F5**. You can restore the above system default settings by pressing **F6**.

## Installing Optional Hardware

This section describes how to open the computer and install hardware options. Generally, you will:

- read the appropriate instructions in this section and in the documentation provided with the option(s)
- remove the computer cover, and install the option(s)
- replace the computer cover
- run the setup utility to complete the installation of drives, memory, or expansion adapters

You will need a #2 Phillips-head screwdriver to remove the computer cover and install or remove expansion adapters.

If you are adding main logic board components, refer to the "Mainboard User's Manual" section of this manual.

➢ **Note:** The real time clock battery is not user replaceable. For battery replacement, contact your local Radio Shack store or dealer to arrange for battery replacement.

If you choose not to install a hardware option yourself, your computer dealer will arrange to have the installation done for you.

### Opening the Computer

1. Before you open the computer, be sure that it is located in a safe working area, its power is off, and the keylock is unlocked. Unplug the computer, and disconnect any cables you have attached.

➢ **Caution:** Static electricity can damage electronic components in a computer. Before opening the computer, discharge any accumulated static electricity from your body by touching a grounded metal object.

2. Remove the three screws in the rear of the chassis (upper left corner, upper right corner, and center).
3. Pull the outer cover forward.
4. Slide the outer cover forward until the rear screw bracket connects to the front lip of the chassis.
5. Lift the cover up to clear the front lip of the chassis.
6. Slide the cover forward and off.

### Removing the Hard Drive or Adding System Memory

1. Disconnect the power cables from the main logic board and from the drives. (Do not disconnect the power switch cable.)
2. Remove the four screws securing the power supply, located in the rear of the chassis.
3. Push the power supply forward until the front tabs are cleared.
4. Lift the power supply out.
5. If you are removing the hard drive, remove the three screws that secure the drive cage to the chassis, located at the front of the drive cage.
6. Slide the drive cage forward until the hooks on the drive cage clear the mainboard plate holes.
7. Lift the drive cage up and out.

Install the option(s) according to documentation supplied.

### Reinstalling the Drive Cage

1. Align the hooks on the bottom of the drive cage to the holes in the mainboard plate.
2. Slide the drive cage towards the back of the chassis until the front edge of the drive cage connects with the chassis.
3. Reinstall the three screws you removed.

### Reinstalling the Power Supply

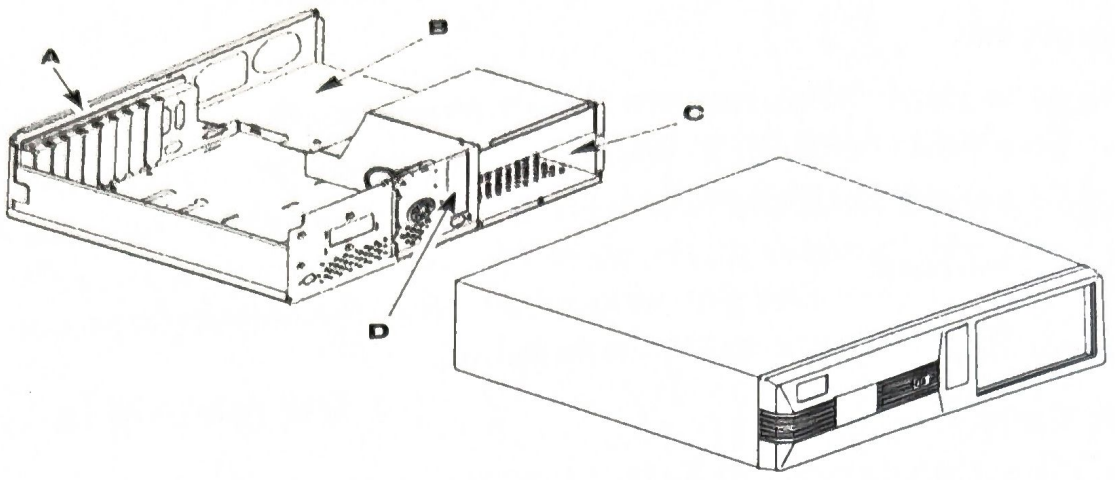
1. Slide the power supply onto the back of the drive cage.
2. Make sure the power supply properly connect to the tabs in the drive cage.
3. Reinstall the four screws you removed.

### Completing the Installation

1. Reconnect the power cables to the main logic board and drives.
2. Connect all other internal cables securely and make certain they do not cause mechanical interference.
3. Slide the back of the cover over the front of the chassis so that the RF clips in the rear of the cover clear the front lip of the chassis.
4. Make sure the sides of the cover are properly seated in the RF channels on either side of the chassis base.
5. Slide the cover towards the back until it properly connects to the rear panel.
6. Secure the cover with the three screws you removed.
7. Reconnect all external cables.
8. Turn on the computer.
9. Run the setup utility to complete the installation.

### Inside Your Computer

The following illustration shows the chassis with the cover removed. It also notes the available adapter slots and drive bays. The front bezel on your computer may differ; the chassis of your computer is the same.




A Three 16-bit and one 8-bit slots
B Power supply platform (power supply removed)
Hard drive mounted under power supply platform
C Three 5¼-Inch drive bays
D 3½-Inch diskette drive

## Documentation

The following documentation is included within this manual:

- Mainboard User's Manual
- Graphics Adapter Operations Manual
- Multi I/O Card

The following documentation reference refers you to the appropriate manual section for specific information about your computer.

### Documentation Reference

| For information about: | Refer to: |
|---|---|
| System setup<br>Running utilities<br>Main logic board layout<br>Microprocessor<br>Cache<br>Connectors<br>Jumper settings<br>System memory configuration and upgrade | Mainboard User's Manual |
| Video utilities<br>Video configuration<br>Video modes supported<br>Video memory options | Graphics Adapter Operations Manual |
| Serial ports (for serial devices such as a mouse)<br>Parallel ports (for parallel devices, such as a printer)<br>Game port (for joystick) | Multi I/O Card |
| Floppy controller (for diskette drives)<br>IDE controller (for IDE hard disk drives) | Multi I/O Card |

If you need additional assistance with your computer, contact your computer dealer.

# Mainboard User's Manual

# 486-J

# MAIN BOARD
# USER'S MANUAL

DOC. NO. : 11869
Rev. : B1
Date : JULY 1993

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# INTRODUCTION

## OVERVIEW

The 486-J mother board is a high performance system board, that offers outstanding features and performance for building advanced personal computers or workstations.

**High-speed Memory**

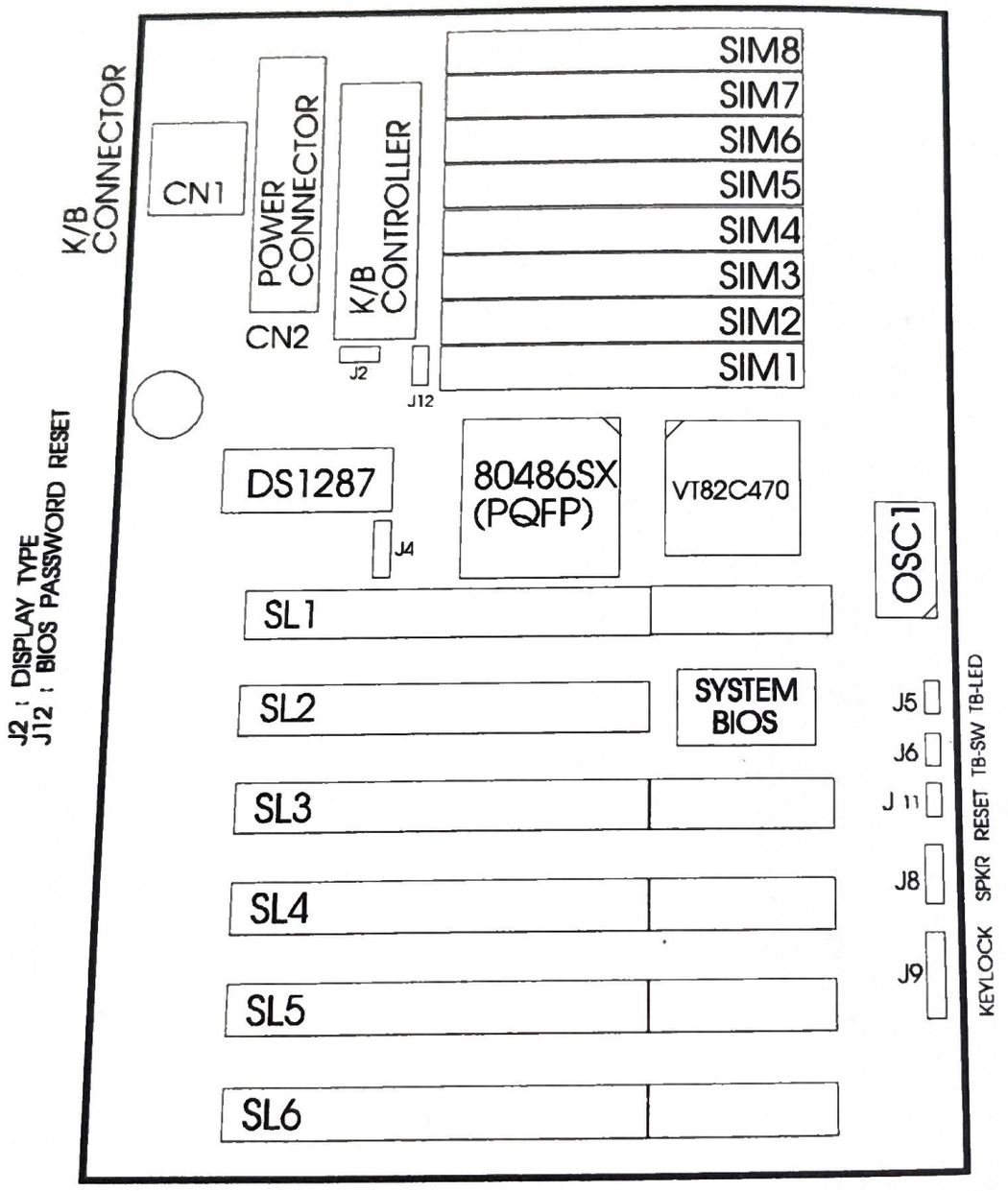
The 486-J mother board can accommodate up to 32 megabytes of on-board memory, using 256KB, 1MB and 4MB SIMMS.

## SPECIFICATIONS

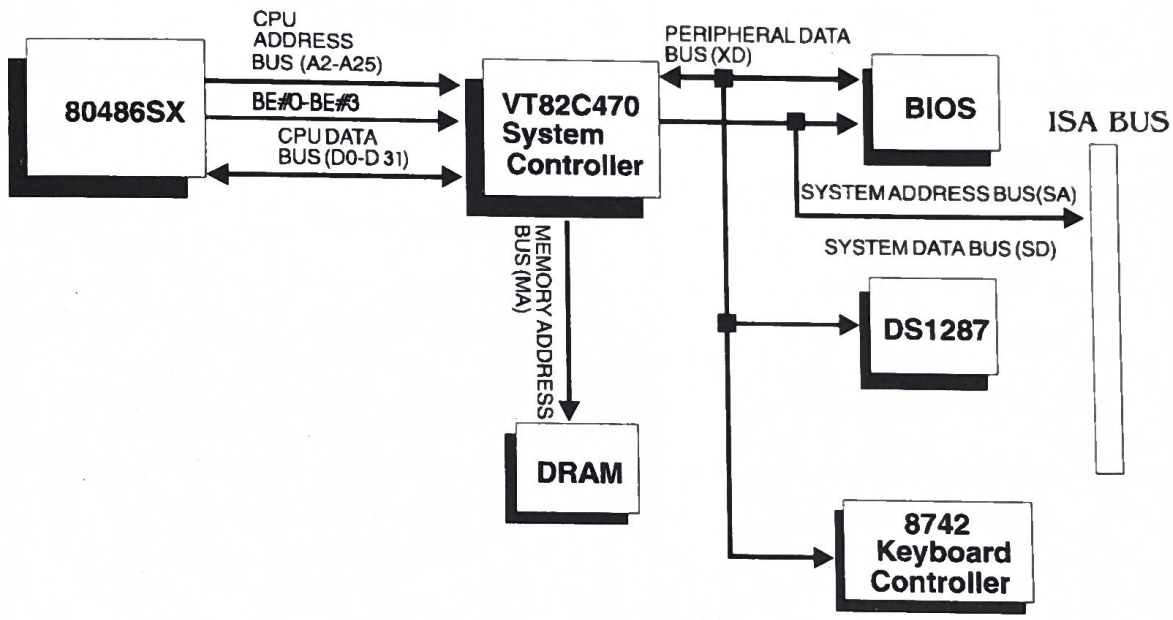
The 486-J mother board comes with the following features:

- 486SX-25 microprocessor.
- VIA VT82C470 PC/AT Chipset for high performance.
- Supports 1MB to 32MB of DRAM memory using 70ns DRAM for 25MHz operation.
- Shadow RAM.
- 64KB BIOS.
- Five 16-bit expansion slots and one 8-bit slot.
- Real time clock/calendar.

# MOTHERBOARD LAYOUT



# SYSTEM BLOCK DIAGRAM



# INSTALLATION

## CONNECTOR &JUMPER PINOUTS

| CONNECTOR | FUNCTION | PIN OUTS | SIGNAL NAME |
|---|---|---|---|
| J5 | Turbo LED | 1<br>2 | VCC<br>LED |
| J6 | Turbo Switch | 1<br>2 | GND<br>Turbo signal |
| J11 | Hardware reset | 1<br>2 | GND<br>Reset signal |
| J8 | Speaker connector | 1<br>2<br>3<br>4 | Speaker signal<br>NC<br>GND<br>+5V |
| J9 | Key lock &<br>power LED | 1<br>2<br>3<br>4<br>5 | Power signal<br>Spare<br>GND<br>Keylock<br>GND |
| CN1 | Keyboard connector | 1<br>2<br>3<br>4<br>5 | Keyboard clock<br>Keyboard data<br>No connection<br>GND<br>+5V |
| CN2 | Power connector | 1 2 3<br>4<br>5 6 7 8<br>9<br>10<br>11<br>12 | +5V<br>- 5V<br>GND<br>- 12V<br>+12V<br>+5V<br>Power good |

# JUMPER DESCRIPTION

| JUMPER | FUNCTION | OPEN | CLOSE |
|---|---|---|---|
| J2 | Display type | Mono/EGA/ VGA (default) | Color |
| J12 | Password reset (For AMI BIOS) | Normal | Reset |

# SYSTEM MEMORY

## MEMORY CONFIGURATION

| MEMORY | BANK0 | BANK1 |
|---|---|---|
| 1M | 4 -256k x 9 | |
| 2M | 4 -256k x 9 | 4 -256k x 9 |
| 4M | 4 -1M x 9 | |
| 5M | 4 -256k x 9 | 4 -1M x 9 |
| | 4 -1M x 9 | 4 -256k x 9 |
| 8M | 4 -1M x 9 | 4 -1M x 9 |
| 16M | 4 -4M x 9 | |
| 17M | 4 -256k x 9 | 4 -4M x 9 |
| | 4 -4M x 9 | 4 -256k x 9 |
| 20M | 4 -1M x 9 | 4 -4M x 9 |
| | 4 -4M x 9 | 4 -1M x 9 |
| 32M | 4 -4M x 9 | 4 -4M x 9 |

# AMI BIOS SETUP

## SETUP SYSTEM CONFIGURATION

A SETUP program has been built into the system BIOS so the configurations stored in the CMOS RAM can be changed. This program is executed when:

(1) User changes system configuration.

(2) User changes system backup battery.

(3) System detects a configuration error and asks the user to run the SETUP program.

After power-on RAM testing, the message below appears:

"Press <DEL> if you want to run SETUP."

Press "DEL" to run setup or do nothing to bypass.

If the "DEL" key is pressed, the following screen is displayed:

```
AMI BIOS SETUP PROGRAM - BIOS SETUP UTILITIES
(C) 1992 American Megatrends Inc., All Rights Reserved

        STANDARD CMOS SETUP
        ADVANCED CMOS SETUP
        AUTO CONFIGURATION WITH BIOS DEFAULTS
        AUTO CONFIGURATION WITH POWER-ON DEFAULTS
        CHANGE PASSWORD
        AUTO DETECT HARD DISK
        HARD DISK UTILITY
        WRITE TO CMOS AND EXIT
        DO NOT WRITE TO CMOS AND EXIT

Standard CMOS Setup for Changing Time, Date, Hard Disk Type, etc.

ESC : Exit  ↓→↑ Sel  F2/F3 : Color  F10 : Save & Exit
```

Use ↓ and ↑ keys to select and press "Enter" to run the selected program.

# STANDARD CMOS SETUP

| Standard CMOS Setup |
| --- |
| Date : (current - MM/DD/YY) |
| Times (current : hh/mm/ss) |
| Base Memory : 640KB |
| Extended Memory : 8072KB |
| Hard disk C Type : 47 =User Type<br>Cylinder : 1001<br>Heads :15<br>WPoom :0<br>Landing Zone : 0<br>Sectors : 17<br>Size : 125MB |
| Hard disk D: Not installed |
| Flooy drive A: 1.44 MB, 3 1/2-inch |
| Flooy drive B: Not installed |
| Primary display : VGA/PGA/EGA |
| Keyboard : Installed |

The SETUP program is completely menu driven. Use the arrow keys to select an entry; "PgUp"/"PgDn" keys to change an entry; and "Esc" key to exit. Help messages are displayed in a window on the screen, when Alt-F1 is pressed.

The standard CMOS SETUP screen is shown above. System BIOS automatically detects memory size, thus no changes are necessary. After the changes are made, press"Esc" to exit.

# ADVANCED CMOS SETUP

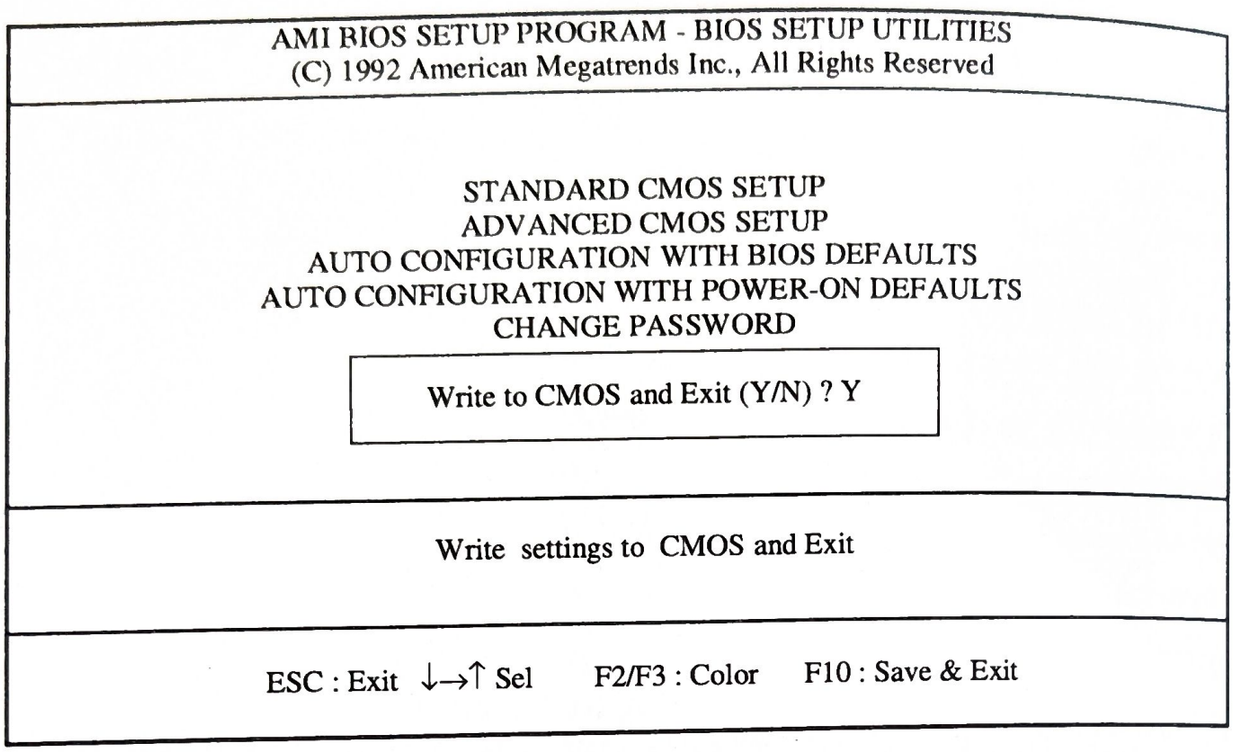
| Advanced CMOS Setup | |
|---|---|
| Typematic Rate Programming : disabled | Adaptor ROM Shadow C800, 32K:disabled |
| Typematic Rate Delay : 500 ms | Adaptor ROM Shadow D000, 32K:disabled |
| Typematic Rate:15 charactor per second | Adaptor ROM Shadow D800, 32K:disabled |
| Above 1 MB Memory Test :disabled | Adaptor ROM Shadow E000, 64K:disabled |
| Memory Test Tick Sound :enabled | BootSector Virus Protection:enabled |
| Hit <DEL> Message Display:enabled | BIOS Cacheable Option: enabled |
| Hard Disk Type 47 RAM Area:0:300 | Video Cacheable Option: enabled |
| Wait For <F1> If Any ErroreEnabled | 256K Relecate Option:disabled |
| System Boot Up Num Lock:On | ISA Bus Command Delay :disabled |
| Numeric Processor Test:enabled | ISA Slave Wait States:5 wait states |
| Weitek Processor:absent | I/O Recovery Time:disabled |
| Floppy Drive Seek At Boot:enable | Extended ALE:disabled |
| System Boot Up Sequence:A:, C: | Decouple Refresh:disabled |
| System Boot Up CPU Speed: high | AUTO Config Option:enabled |
| External Cache Memory: enabled | DRAM Speed Select:0 wait states |
| Internal Cache Memory: enabled | Bus Clock Rate Select:CLK2/1.5 |
| Password Checking Option:Setup | Cache Read Cycle Select:0 wait states |
| Video RAM Shadow C000,32K : enabled | Cache write Cycle Select:0 wait states |

Moving around the Advanced CMOS SETUP program shown above is similar to moving around Standard CMOS SETUP.

Users are not encouraged to run Advanced CMOS setup program. Your system should have been fine-tuned before shipping. Improper setup may cause the system to fail, consult your dealer before making any changes.

**Warning :** If you enter incorrect values into the fields of the Advanced CMOS Setup screen. Your computer may not function properly. If your computer fails to function properly after you reset the advanced potions, clear the CMOS and reset your computer.

# WRITE TO CMOS AND EXIT


AMI BIOS SETUP PROGRAM - BIOS SETUP UTILITIES
(C) 1992 American Megatrends Inc., All Rights Reserved
STANDARD CMOS SETUP
ADVANCED CMOS SETUP
AUTO CONFIGURATION WITH BIOS DEFAULTS
AUTO CONFIGURATION WITH POWER-ON DEFAULTS
CHANGE PASSWORD
Write to CMOS and Exit (Y/N) ? Y
Write settings to CMOS and Exit
ESC : Exit ↓→↑ Sel F2/F3 : Color F10 : Save & Exit

After making the necessary change under SETUP, press "Esc" to return to the main menu, move cursor to "Write to CMOS and Exit ", and press "y" to change the CMOS Setup. If no changes were made, press "ESC" again and press "y", to retain the CMOS settings.

APPENDIX B

# HARD DISK SPECIFICATIONS

## CONNER

| MODEL | CAPACITY | CYLINDER | HEAD | SECTOR |
|---|---|---|---|---|
| CP-30084 | 85MB | 526 | 8 | 39 |
| CP-30084E | 85MB | 526 | 8 | 39 |
| CP-30104 | 120MB | 726 | 8 | 39 |
| CP30104H | 120MB | 726 | 8 | 39 |
| CP-30174 | 170MB | 903 | 8 | 46 |
| CP-30174E | 170MB | 903 | 8 | 46 |
| CP-30204 | 200MB | 683 | 16 | 38 |
| CP-30204F | 200MB | 683 | 16 | 38 |
| CP-30254 | 251MB | 895 | 10 | 55 |
| CP-3364 | 360MB | 702 | 16 | 63 |
| CP-3544 | 544MB | 1024 | 16 | 63 |

## MAXTOR

| MODEL | CAPACITY | CYLINDER | HEAD | SECTOR |
|---|---|---|---|---|
| 7120A | 120MB | 1023 | 14 | 17 |
| 7170A | 170MB | 984 | 10 | 34 |
| 7213A | 213MB | 683 | 16 | 38 |
| 7245A | 245MB | 967 | 16 | 31 |
| 7345A | 345MB | 790 | 15 | 57 |

## QUANTUM

| MODEL | CAPACITY | CYLINDER | HEAD | SECTOR |
|---|---|---|---|---|
| LPS80AT | 80MB | 611 | 16 | 17 |
| LPS105AT | 105MB | 755 | 16 | 17 |
| LPS120AT | 120MB | 901 | 5 | 53 |
| LPS240AT | 240MB | 723 | 13 | 51 |
| ELS85AT | 85MB | 977 | 10 | 17 |
| ELS127AT | 127MB | 919 | 16 | 17 |
| ELS170AT | 170MB | 1011 | 15 | 22 |

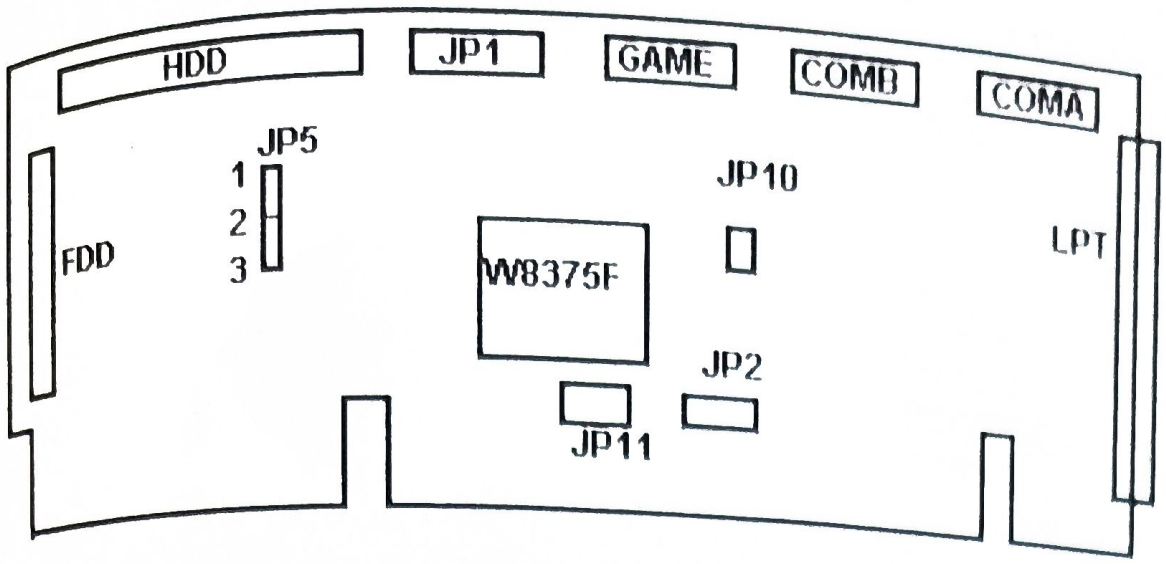
## SEAGATE

| MODEL | CAPACITY | CYLINDER | HEAD | SECTOR |
|---|---|---|---|---|
| ST3096A | 85MB | 1024 | 10 | 17 |
| ST3120A | 102MB | 1024 | 12 | 17 |
| ST3144A | 125MB | 1001 | 15 | 17 |
| ST3283A | 245MB | 978 | 14 | 35 |

## WESTERN DIGITAL

| MODEL | CAPACITY | CYLINDER | HEAD | SECTOR |
|---|---|---|---|---|
| AC280 | 85M | 980 | 10 | 17 |
| AC2120 | 125M | 872 | 8 | 35 |
| AC2200 | 200M | 989 | 12 | 35 |
| AC2250 | 255M | 1010 | 9 | 55 |
| AC2340 | 341M | 1010 | 12 | 55 |

# Multi I/O Card




## Specifications

- One Centronics parallel port
- Two RS232 serial ports
- One game port
- One floppy disk controller
- One IDE hard disk interface (support for two IDE drives)

## Jumper Settings

The following tables show the jumper settings of the I/O adapter. An asterisk (*) notes that a setting is the factory default setting for that jumper block.

## Jumper Settings for JP1

| Function | Pins | Setting |
|---|---|---|
| Disable hard disk | J1 | Jumper at H |
| Enable hard disk | J1 | Jumper at L* |
| Disable floppy disk | J2 | Jumper at H |
| Enable floppy disk | J2 | Jumper at L* |
| Set COM A as COM 4 | J3<br>J4 | Jumper at L<br>Jumper at L |
| Set COM A as COM 1 | J3<br>J4 | Jumper at L*<br>Jumper at H* |
| Set COM A as COM 3 | J3<br>J4 | Jumper at H<br>Jumper at L |
| Disable COM A | J3<br>J4 | Jumper at H<br>Jumper at H |
| Set COMB as COM 3 | J5<br>J6 | Jumper at L<br>Jumper at L |
| Set COM B as COM 2 | J5<br>J6 | Jumper at L*<br>Jumper at H* |
| Set COM B as COM 4 | J5<br>J6 | Jumper at H<br>Jumper at L |
| Disable COM B | J5<br>J6 | Jumper at H<br>Jumper at H |
| Set LPT as LPT1 | J7<br>J8 | Jumper at L*<br>Jumper at L* |
| Set LPT as LPT3 | J7<br>J8 | Jumper at L<br>Jumper at H |
| Set LPT as LPT2 | J7<br>J8 | Jumper at H<br>Jumper at L |
| Disable LPT | J7<br>J8 | Jumper at H<br>Jumper at H |

## Jumper Settings for JP2

| Function | Pins | Setting |
|---|---|---|
| Set IRQ5 for JP2 | 1-2 | Jumper installed |
| Set IRQ7 for LPT | 2-3 | Jumper installed* |

## Jumper Settings for JP5

| Function | Pins | Setting |
|---|---|---|
| Enable hard disk LED | JP5 | Jumper installed* |

## Jumper Settings for JP9

| Function | Pins | Setting |
|---|---|---|
| Set change mode for floppy disk drives A and B | 1-2 | Jumper installed |
| Set normal mode for floppy disk drives A and B | 2-3 | Jumper installed* |

## Jumper Settings for JP10

| Function | Pins | Setting |
|---|---|---|
| Enable game port | JP10 | Jumper installed* |
| Disable game port | JP10 | Jumper not installed |

## Jumper Settings for JP11

| Function | Pins | Setting |
|---|---|---|
| Set parallel port mode as output only | JP11 | Jumper installed* |
| Set parallel port mode as bidirectional | JP11 | Jumper not installed |

## FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency and, if not installed and used in accordance with the instructions, my cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment of and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

# Graphics Adapter Operations Manual

The follow manual includes chapters on installing the board, installing the software, and using the utilities. Please note that the board is already installed in your computer and that the software is already installed on your hard drive. Refer to the hardware installation information should you need to reinstall the adapter.

# ColorDesigner A3

GRAPHICS ADAPTER
User's Manual

Version 3.0

**FCC Notice:**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Notice: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

. Reorient or relocate the receiving antenna.

. Increase the separation between the equipment and receiver.

. Plug the computer into a different outlet so that the two devices are on different branch circuits.

. If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

**Warning:**

The use of non-shielded interface cable is prohibited.

The user is cautioned that changes and modifications made to the equipment without the approval of the manufacturer could void the user's authority to operate this equipment.

CSA Notice: This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

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# CHAPTER 1: INTRODUCTION AND HARDWARE

Congratulations on the purchase of your VGA board! You are now the owner of a state-of-the-art video adapter that offers features and functionality equal to, and beyond any other in the VGA class.

## FEATURES

- ☞Cirrus Logic GD5422 VGA chip (Acumos AVGA3)
- ☞Register and BIOS level compatibility with the IBM VGA Adapter.
- ☞Window accelerator (hardware cursor 32x32x16) can speed up Window operation
- ☞Extended graphics resolution modes providing 640x480, 800x600, and 1024x768 High resolution in 16 and 256 simultaneously display colors.
- ☞Support maximum 72HZ refresh rate (VESA standard).
- ☞HiColor graphics mode producing 640x480 and 800x600 resolution with 65,535 simultaneously display colors.
- ☞True Color graphics mode producing 640x480 16.7M simultaneously display colors.
- ☞132 Column text modes support
- ☞Drivers support extended graphics and text modes for most popular software.

## Modes supported by the VGA card

VGA modes --- all VGA modes are supported. This is the power on default onfiguration of the VGA BIOS.

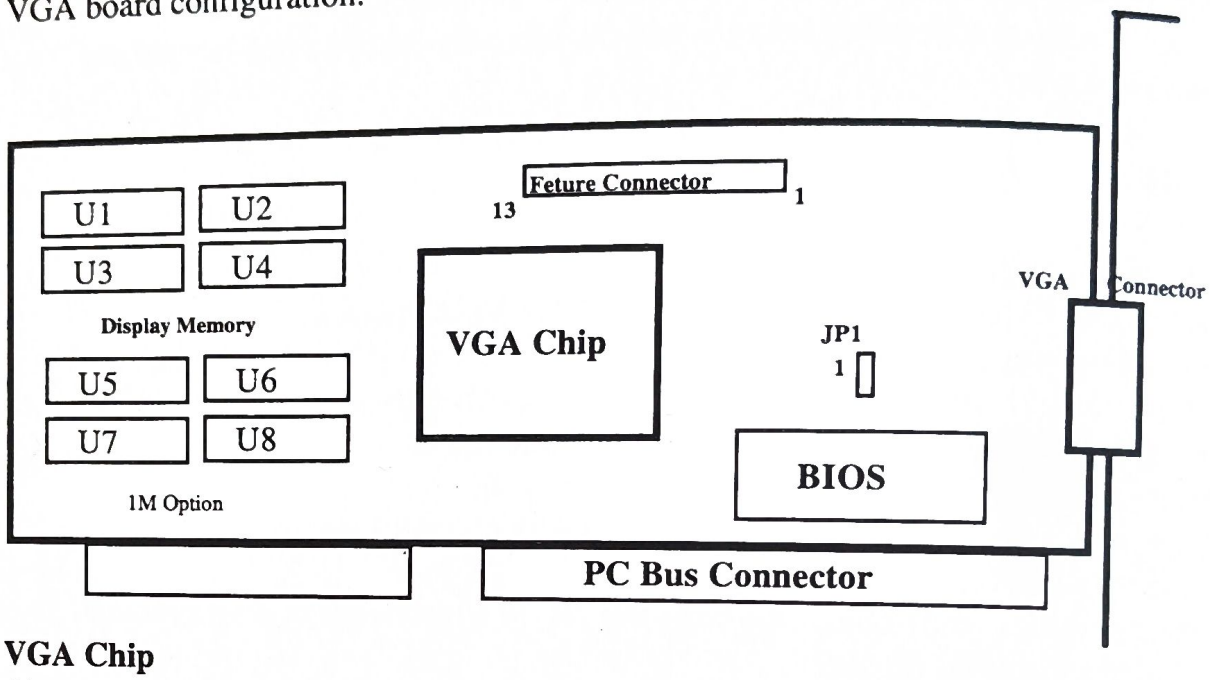
VGA, SVGA and Enhanced VGA Resolutions:

| | | |
|---|---|---|
| 640x480 | 16,256,64K,16.7Million | colors |
| 800x600 | 16,256,64K | colors |
| 1024x768 | 16,256 | colors |
| 132 Column text modes | | |

*** For more information, please check the Appendix of the manual

## LAYOUT

The component locator below will help you to find the components that comprise your VGA board configuration.




**VGA Chip**
Cirrus Logic GD5422 VGA chip (on-chip RAMDAC)

**Video BIOS**
This is the video Basic Input Output System. It is the software interface for programming the VGA card. It simplifies and unifies programming of the display card.

**PC Bus Connector**
PC-AT or compatible systems expansion slot bus connector.

**Video Connector**
15-pin connector for VGA monitor cable to plug in.

**Feature Connector**
VESA-standard feature connector

**Display Memory**
The size of display memory on your VGA card determines the graphic resolutions and number of colors the card can support.

## Memory-Resolution/Color

The following resolutions/colors require 512KB of memory/DRAM chips installed in U1 to U4, as shown in the layout on Page 1-2.

| | |
|---|---|
| 320x200 | in 256 colors |
| 640x350 | in 16 colors |
| 640x480 | in 16 colors |
| 800x600 | in 16 colors |
| 640x480 | in 256 colors |
| 800x600 | in 256 colors |
| 1024x768 | in 16 colors |

The following resolutions/colors require 1MB memory. Your card already has 512KB of memory installed. For upgrading from 512KB to 1MB, four pieces of 256Kx4 type DRAMs must be installed into sockets U5 to U8, as shown on the layout.

| | |
|---|---|
| 640x480 | in 64K/16.7M colors |
| 800x600 | in 64K colors |
| 1024x768 | in 256 colors |

# CHAPTER 2: INSTALLATION

## Installing the VGA Card

### Tools you may need

To install your VGA Card, you may need some or all of the following tools:
o medium size flat blade screwdriver,
o medium sized phillips head screwdriver,
o a 3/16-inch nutdriver or wrench.

### Open the Computer System

Before you open your system, be sure that you have turned off your system unit and all devices connected to it. Disconnect the cables from the back of the system in order to give yourself more room to work. Note how all cables are connected prior to disconnection.

In a typical IBM AT compatible computer all cover mounting screws are located on the back of the computer. Remove these screws. Carefully slide the system unit cover forward. When the cover will go no further, tilt it up and lift it away.

### Install the VGA Card in your Computer

o Check that the power is turned off.
o If necessary, remove a system expansion slot cover by removing its retaining screw and lifting it out. Save the screw.

o Hold the VGA Card by its top corners and slide it into the system unit. Make sure that the VGA Card is correctly seated in the expansion slot (16-bit slot).

o Secure the VGA Card with the screw that you removed in the step above.

o Properly set your computer's system switches (or jumpers).

o Replace and secure the system cover.

o Plug your VGA compatible or multi-frequency display into the 15 pin D-shaped video connector at the back of the VGA Card.

**Important note**: If you are using a multi-frequency monitor, you may need a special 15-pin PS/2 compatible adapter cable, and you will need to make sure that your multi-frequency monitor is configured properly for a PS/2 compatible analog VGA signal. Many multi-frequency displays have a switch to select "TTL" or "analog" operation; set this switch for "analog". Check with your display equipment dealer or display manufacturer for additional information on configuring your monitor.

After you have physically installed your VGA Card in your AT-compatible system, use the SETUP program supplied with your system to tell your computer about the equipment installed in your system. When using AT and compatible SETUP programs with the VGA Card, please follow these steps.

Run SETUP to configure your system. Sometimes this utility comes on a disk, sometimes it is built in to your system's ROM BIOS. When you arrive at the part of the program where video support is specified, the program may ask you if the monitor you are looking at will be the primary monitor. Answer, "YES". If you are presented with a list of video options, select the option for "VGA".

If no option for VGA is listed, select support for EGA. The VGA Card will look to many systems like an EGA card. If you don't see an option for "EGA", try the option for "NO MONITOR", "RESERVED" or "SPECIAL". These will usually work. If not, see your equipment dealer. At the conclusion of the SETUP program, the computer will restart as if you had just turned on the power.

Your system is now ready to receive the VGA.

## Operation

If you have followed the installation instructions in this manual, you are now ready to use your VGA equipped computer system. Most software that is compatible with IBM's Personal System/2, VGA or EGA will run automatically on your system using the VGA Card. Just turn on your computer system and install your application package for "PS/2 model 50, 60 or 80 video", "VGA" or "EGA" as instructed by the software manufacturer.

## Software Installation

Before using the UTILITY & DRIVER Diskettes , make a copy for safety.

**Easy installation**

The installation utility is provided to facilitate the smooth installation of the display drivers and utility software. The installation program is menu-driven and allows you to select and install only those display drivers for software and applications currently in use. It is important to note that some display drivers need to have the associated vendor's application program already installed on the system prior to loading the Cirrus Logic VGA display drivers. In other cases, the loading of the display driver may be an integral part of the vendor's product installation process. Please review the driver product section below for specific instructions prior to running the installation program. The installation utility is located on the diskette labeled DISK 1. To install the desired display drivers and utilities, insert the diskette into the A: drive, type :

**A:**[Enter]
**INSTALL**[Enter]

Follow the instructions on the screen to install the listed display drivers. At any time you may press [Esc] to abort the installation process and go back to DOS. Selected drivers are simply copied to the specified disk and directory. Applications may require additional installation as described in Chapter 3,4.

# CHAPTER 3: UTILITY SOFTWARE

First, please install the Utility Software by type:

**A:**[Enter]
**INSTALL**[Enter]

(located in the diskette #1 come with your VGA board)

The VGA Utilities now are located in directory you type in INSTALL procedure (such as UTILITY)
Following are descriptions of these VGA utilities:

CLMODE.EXE - Provides the ability to set the standard VGA and extended VGA modes of the VGA, and select the best way to use the VGA for your VGA monitor.
CLMODE.DAT - data file used by CLMODE.EXE
RIXVIDEO.DSC - RIX configuration file
VPIC.CFG -- VPIC configuration file
README - Text about RIXVIDEO and VPIC
RAMBIOS.EXE - A RAM resident copy of the VGA video BIOS routines to speed up video operations on access to the BIOS.

## Using CLMODE.EXE

The CLMODE utility allows the user to define the type of monitor attached and set the video modes supported by the Cirrus Logic VGA.

### Using CLMODE's menu-driven interface

At the DOS prompt type:

**CLMODE**[Enter]

The main popup window consists of two pull-down menus: Setup and Help. Each pull-down menu contains two or more menu items. The underlined letter of a menu item specifies the hot key combination for that item. For example, press the [Alt] and [T] keys simultaneously or just

the [T] key to select the Monitor option. Note that a mouse driver must first be installed prior to running the CLMODE utility in order to use the mouse pointer for menu selection.

## Choosing the attached monitor type

Selecting the proper monitor type will allow the VGA to display the highest quality output that it is capable of with the attached monitor. The monitor type determines what video modes will be available to your system. It will also determine the vertical refresh rates available.Generally, the higher the refresh, the better the screen will look.
The high refresh option of CLMODE allows the user to force some video modes to a higher refresh rate. The option will not work on some monitors. If high refresh is selected, the user must verify that the connected monitor can support the option by using CLMODE to set video mode 12 and then video mode 3. If you observe any problems in either mode, disable the option by typing:

**CLMODE 3 m-[Enter]**

from the directory containing CLMODE.EXE. Depending on the monitor that you are using, the high refresh option may have made the display unreadable and you will have to type in the CLMODE command without being able to read it. Select Setup from the main window, then choose the Monitor Type menu item. The Monitor Type Setup window will be displayed. The current monitor type and refresh rate will be highlighted initially. Use the keyboard or the mouse to choose the type of monitor attached. To move down to the Refresh Rate Selection box, use the mouse or press the [Tab] key. Press the OK button to set the new monitor type. Press the Cancel button to discard any changes. Press the Help button to get a detailed explanation on the monitor types and the VGA refresh rates.
On some systems the monitor type will be remembered from one session to the next. To test this, select a monitor type and exit the CLMODE program. Turn the computer off for ten seconds. After rebooting the computer, run CLMODE and verify whether or not the monitor that you selected is still enabled. If it is, you should not need to set it again in normal use. If the monitor type was not kept then it is necessary to run the CLMODE utility every time that the computer is turned on. The best way to do this is to insert it into the AUTOEXEC.BAT file using the command line options documented below.

## Setting the video mode

Select Setup from the main window, then choose the Set Mode menu item. The Video Mode Setup window displays all the modes supported according to the monitor type attached and the video memory present. Use the mouse or the keyboard to move the highlighted bar to the video

mode desired. To set the mode, press [Alt] and [X] keys simultaneously, or position the mouse cursor on the Exit button and press the left mouse button. After CLMODE exits back to DOS, the desired video mode will be set. If the monitor type has been changed to a type that does not support the video mode in use when CLMODE was started, CLMODE will default to mode 3+.

**Retrieving the current VGA controller status**

The information in the main window displays the VGA controller type, the BIOS version number and the amount of video memory present.

## Getting Help

CLMODE provides Help for the following items: Monitor Type, Set Mode, Mouse, Keyboard and About. The Monitor Type help window explains the different capabilities of each monitor type. The Set Mode help window defines the information given in the Set Mode window. The Keyboard and Mouse help windows explain how to use the keyboard and the mouse to make selections. The About window displays the Cirrus Logic copyright message and the CLMODE version number.

## Exiting the CLMODE menu-driven utility program

To exit CLMODE at any time, press [Alt] and [F4] keys simultaneously, or click the left mouse button on the system button of the main window (suc as, the top left corner button of the window which is shown as a dot), or select Setup from the main windows then choose Exit CLMODE. When CLMODE utility exits, the current video mode, monitor type, and VGA refresh rate will be displayed.

## Using CLMODE's command line options

When command line options for CLMODE.EXE are given at the DOS prompt, the menu-driven windows will not be displayed. Instead, monitor type, video mode and refresh rate will be set at the DOS prompt. Therefore, CLMODE.EXE can be placed in the autoexec.bat file to automate the configuration process. The command line options for CLMODE.EXE are:

**CLMODE [[modenum][+*-]] [m[montype][refresh]]**

| | |
|---|---|
| [modenum] | mode number |
| [+*-] | + selects 400 lines (default) |
| | * selects 350 lines |
| | - selects 200 lines |

| | |
|---|---|
| [montype] | monitor type |
| [refresh] | high or low VGA refresh rate (+ or -) |

Valid monitor types:

| | |
|---|---|
| 0 | VGA |
| 1 | 8514 |
| 2 | Super VGA (default) |
| 3 | Extended Super VGA |
| 4 | Multifrequency |
| 5 | Extended Multifrequency |
| 6 | Super Multifrequency |
| 7 | Extended Super Multifrequency |

Valid VGA refreshes:

| | |
|---|---|
| - | Low VGA refresh (default) |
| + | High VGA refresh |

For example, to select mode 3 with high VGA refresh for a Super VGA monitor, type the following command at the DOS prompt:

**CLMODE 3+ m2+**[Enter]

Typing an invalid option will display the command line help text.
Typing **S** as a command line option will display the current CLMODE settings.

**Note :** For monitor type **m** use **lowercase** .

Following is a table of common monitor types and associated values that you should use for the monitor type option. Resolutions with more then one entry per line in the vertical frequency column signify the availability of the high refresh option.

Monitor Samples:

| Number | Example | HFreq | VFreq | Resolution |
|---|---|---|---|---|
| 0 | IBM 8512<br>IBM 8513<br>IBM 8503 | 31.5 | 60/70 | 640x480, 720x400 |

| | | | | |
|---|---|---|---|---|
| 1 | IBM 8514<br>IBM 8515 | 31.5<br>35.5 | 60/70<br>43.5 | 640x480, 720x400<br>1024x768 * |
| 2 | NEC 2A | 31.5<br>35.1 | 60/70<br>56 | 640x480, 720x400<br>800x600 |
| 3 | NEC II | 31.5<br>35.1<br>35.5 | 60/70<br>56<br>43.5 | 640x480, 720x400<br>800x600<br>1024x768 * |
| 4 | NEC 3D | 31.5<br>35.5<br>37.8 | 60/70<br>43.5<br>60 | 640x480, 720x400<br>1024x768 *<br>800x600 |
| 5 | Sony CPD-1304<br>NEC 3FGx<br>Nanao 9065S | 31.5<br>48.0<br>48.0 | 60/70<br>72<br>60 | 640x480, 720x400<br>800x600<br>1024x768 |
| 6 | NEC 4D<br>NEC 4FG<br>Nanao T240i | 31.5<br>48.0<br>56.5 | 60/70<br>72<br>70 | 640x480, 720x400<br>800x600<br>1024x768 |
| 7 | NEC 5D<br>NEC 5FG/6FG<br>Nanao T560i | 31.5<br>48.0<br>56.5 | 60/70<br>72<br>70 | 640x480, 720x400<br>800x600<br>1024x768 |

* - interlaced mode
HFreq - horizontal frequency (kHz)
VFreq - vertical frequency (kHz)

Type **CLMODE ?** [Enter] will show this message.

# CHAPTER 4: SOFTWARE DRIVERS

For more information about using **Software drivers**, see **Manual File**, "**Software Drivers**" in the Driver Diskette **#2**.

**Before you begin**

For more information about using **Before you begin**, see **Manual File**, "**Before you begin**" in the Driver Diskette **#2.**

## Microsoft Windows

### Installing Windows 3.1 (or Windows 3.0) display drivers

To install the Windows drivers from the DOS prompt, proceed as follows:

1.Ensure that Windows is already installed on your computer.

2.From your Windows directory, at the DOS prompt, type **SETUP** and press [Enter] to run the Windows SETUP.EXE program. Follow the instructions on the screen. When you come to the screen that lists the hardware and software components such as display adapters (for example, VGA, CGA, and so on), keyboard type, mouse type, etc., go to the Display selection by using cursor keys to move the highlighted bar and press [Enter].

3.From the next menu listing of display options, scroll to the bottom of the list, and highlight the following text:

**Other (Requires disk provided by a hardware manufacturer)**

Press [Enter], and when prompted, type **A:\WIN31**[Enter]. (or A:\WIN30)

4.You will see the list of drivers and their associated resolutions, such as:

**CL GD542x v1.x, 1024x768x16**
**CL GD542x v1.x, 800x600x16**
**CL GD542x v1.x, 640x480x16.8M**
**CL GD542x v1.x, 640x480x256**
**CL GD542x v1.x, 640x480x64K**
**CL GD542x v1.x, 800x600x256**
**CL GD542x v1.x, 800x600x64K**
**CL GD542x v1.x, 1024x768x256**

5.Highlight by moving the cursor to the desired display driver, and then press [Enter].

6.Continue with the remainder of the SETUP procedure. If SETUP tells you to insert the windows driver diskette ,type **A:\WIN31**[Enter] (or A:\WIN30).

## AutoCAD R12

MACH-12 Display List Drivers January 11, 1993 from Cardex(R) - Gainward Co., Ltd
The MACH-12 display list driver is provided in the following files:

PROTECTED MODE DRIVERS (AutoCAD 12)
DSMACH4.EXP - 16 color VGA support, the fastest driver of all (no rendering)
RCMACH8.EXP - 256 color VGA support
RCMACH16.EXP - 32k & 64k color VGA support.
RCMACH24 EXP - 16m color VGA support.

**INSTALLATION FOR AUTOCAD RELEASE 12**

**1.DELETE OLD AUTOBOOST DRIVERS**: If you are using AutoBOOST-Plus or a previous BETA version of MACH-12 with Release 12 of AutoCAD, please delete all old driver files from your ACAD DRV directory.

**2.COPY FILES TO THE HARD DISK**: Copy files to your AutoCAD DRV directory (usually C:\ACAD12\DRV). For example, to copy all files from drive A: to a directory called ACAD12\DRV on the hard drive C:, the following commands may be used:

C:
CD **\ACAD12\DRV**
COPY **A:*.***

You may wish to delete any drivers you do not use after configuring your MACH12. Alternately, you can copy files to a MACH12 subdirectory. This procedure requires you to modify your ACADDRVenvironment variable as follows:

**SET ACADDRV=C:\ACAD12\DRV;C:\MACH12;**

3.CONFIGURE MACH-12: Run MACHCFG.EXE in the directory with the MACH-12 files, then follow instructions. Press [F1] key at any time for help.

**MACHCFG**

4.SAVE CONFIGURED MACH-12 DRIVER: You must save the driver after configuration as follows:

**Save New Configuration**
**Save As: RCMACH8.EXP**

5.CONFIGURE AUTOCAD: To configure AutoCAD, Enter AutoCAD and type CONFIG at the command line prompt. Or go to configure directly:

**ACAD -R**

Select the option to CONFIGURE DISPLAY. Choose your MACH-12 driver:

10) MACH-12, 256-color VGA DLP, from Gainward Co., Ltd.
You should now be ready to run MACH-12! If your driver is not on the menu, exit AutoCAD and either copy the driver to the AutoCAD DRVdirectory or edit the SET ACADDRV variable as described in Step 2.

6.RECONFIGURING MACH-12: Change directories to where your MACH-12 is installed and type MACHCFG. If you copied the configured driver to the AutoCAD DRV directory, you can reconfigure just this driver with the following command from DOS:

**MACHCFG C:\ACAD12\DRV\RCMACH8.EXP**

**Dual Screen Enable/Disable**

If your computer system has both a monochrome (MDA) and a VGA/EGA display, MACH-12 will automatically go into dual screen mode if AutoCAD is run from the monochrome screen. This menu provides you with the option of disabling dual screen mode if you desire to do so. Use arrow keys to toggle choices, press [Enter] key to choose.

**Foreground Display-List Cleanup**

Each time a command such as ERASE, MOVE or COPY is used and causes vectors to be removed from a screen, AutoCAD sends one or more 'erased vectors' to the driver. Most display-list drivers will draw both the original vectors as well as the black 'erase vectors' causing an unpleasant flash on each redraw. The erase vectors often obscure other vectors as well. Display-list clean-up eliminates this problem by removing both vectors from the display-list.

In foreground, display-list clean-up is done immediately upon receiving an erase vector from AutoCAD. When erasing a large number of vectors, foreground clean-up slows down commands such as ERASE, MOVE and COPY. If the complexity of your drawing causes noticeable delays, you can disable either or both of the clean-up modes.

**Background Display-List Cleanup**

Background display-list clean-up is performed after the command causing an erase vector to be created. Command performance is not affected by background display-list clean-up. However, there is a slight delay before the erased vectors are removed, thus after erasing a large block, you may need to wait a second or two before the redraw flash is completely eliminated. If the complexity of your drawing causes noticeable delays, you can disable either or both of the clean-up modes.

**Display-List (DL) Compression**

Whenever foreground or background display list clean-up is enabled, any erased vectors will result in removal of the original vectors from the display list. This in turn causes fragmentation of the display list. Display-List Compression will eliminate such fragmentation if ENABLED. Bird's Eye redraw ratio

To improve the speed at which the Bird's Eye Window is brought up on the screen, it is not updated until it is displayed at which time only the new vectors are added. When the foreground or background display-list clean-up is enabled, the erase vectors may already have been removed by the time the Bird's Eye is displayed. Thus, the Bird's Eye Window may be 'out of sync' with the screen display. This option determines what percentage of the vectors need to be erased, before the Bird's Eye Window is redrawn. A value of '0' will cause a redraw every time the Bird's Eye Window is popped-up on the screen. A value of '50' will cause a redraw after half of the vectors have been removed from display-list since the Bird's Eye Window was last redrawn.

**Set Custom Command Names**

This option allows you to change the names of the MACH-12 commands should they conflict with any of your other customized operations. This is done by using the cursor keys to highlight the command whose name you would like to change, typing in the new name, and then pressing the [Enter] key. After you enter the change, the command name will be updated. The default command names are:

| Description | Default Command Name |
|---|---|
| Clean Display List | CD |
| Anti-alias lines | AO |
| Anti-alias polygons | AP |
| Disable anti-aliasing | AF |

**Set Command Names Sent to Foreign AutoCAD**

MACH-12 performs several functions by passing an AutoCAD command name string back to AutoCAD. Since versions of AutoCAD for different languages may use different names to perform these commands, it may be necessary to inform MACH-12 of the new names. This menu item is used to define the new names. Currently the following three commands are used by MACH-12:

ZOOM
ZOOM PREVIOUS
REDRAW

**Configuring Autoshade and RenderMan**

First set the environment variables using the DOS SET command to where the MACH-12 driver resides. For example if MACH-12 is in drive C:, directory RCMACH, then the following commands would be used:

**SET DSPADI=C:\RCMACH\RCMACH8.EXP**
**SET RCPADI=C:\RCMACH\RCMACH8.EXP**
**SET RDPADI=C:\RCMACH\RCMACH8.EXP**

Next, start AutoShade with the /R command line option:

**SHADE /R**

AutoShade program will then ask several questions about the devices being used. The

following are related to the MACH-12 driver:
Select Display Device: Select the P386 Display Device Interface display driver.
Select Rendering Display Driver:Select the P386 Display Device Interface rendering driver
Do the display and AutoShade rendering devices share a single screen? Answer Y.
Do the display and RenderMan devices share a single screen? Answer Y.
Does flip screen require redraw? Answer Y.
The rest of the questions are answered according to type of the pointing and hardcopy devices being used. It should be noted that only the 256-color, and the 32k-color, drivers work with AutoShade and RenderMan. The 16-color drivers do not.

**Configuring 3D Studio**
First, delete the configuration file 3DADI.CFG. Second, edit the file 3DS.SET, so that device name after the DEFAULT-DISPLAY and MAIN DISPLAY definitions are set to the following:
**DEFAULT-DISPLAY = "rcpadi"**
...
**MAIN DISPLAY = RCPADI**
Note that in the first case there are quotes around the name rcpadi, but not in the second. In the third step, set the environment variable RCPADI using the DOS SET command, to where the MACH-12 driver resides. For example if MACH-12 is in drive C:, directory RCMACH, then the following command would be used:
**SET RCPADI=C:\RCMACH\RCMACH8.EXP**
It should be noted that only the 256-color, and the 32k-color, drivers work with 3D Studio. The 16-color drivers do not.

## Autodesk Device Interface (ADI) Drivers
For more information about using **Autodesk Device Interface (ADI) Driver**, see **Manual File**, "**Autodesk Device Interface (ADI) Driver**" in the Driver Diskette **#2**.

## Display List Driver 386 - VGA
For more information about using **Display List Driver 386 - VGA**, see **Manual File**, "**Display List Driver 386 - VGA**" in the Driver Diskette **#2**.

## Installing DLD386-VGA
For more information about using **Installing D386-VGA**, see **Manual File**, "**Installing D386-VGA**" in the Driver Diskette **#2**.

## Using DLDSETUP

For more information about using **Using DLDSETUP**, see **Manual File**, "**Using DLDSETUP**" in the Driver Diskette **#2**.

## Using DLD386-VGA with AutoCAD 386

For more information about using **Using DLD386-VGA with AutoCAD 386**, see **Manual File**, "**Using DLD386-VGA with AutoCAD 386**" in the Driver Diskette **#2**.

## DLD386-VGA Features and Commands

For more information about using **DLD386-VGA Features and Commands**, see **Manual File**, "**DLD386-VGA Features and Commands**" in the Driver Diskette **#2**.

## AutoShade 2.0 with RenderMan

For more information about using **AutoShade 2.0 with RenderMan**, see **Manual File**, "**AutoShade 2.0 with RenderMan**" in the Driver Diskette **#2**.

## AutoDesk 3D Studio

For more information about using **AutoDesk 3D Studio**, see **Manual File**, "**AutoDesk 3D Studio**" in the Driver Diskette **#2**.

## Framework II

For more information about using **Framework II**, see **Manual File**, "**Framework II**" in the Driver Diskette **#2**.

## GEM/3

For more information about using **GEM/3**, see **Manual File**, "**GEM/3**" in the Driver Diskette **#2**.

## Generic CADD

For more information about using **Generic CADD**, see **Manual File**, "**Generic CADD**" in the Driver Diskette **#2**.

## Lotus 1-2-3, Symphony, and Report Writer v2.x

For more information about using **Lotus 1-2-3, Symphony, and Report Writer v2.x**, see **Manual File**, "**Lotus 1-2-3, Symphony, and Report Writer v2.x**" in the Driver Diskette **#2**.

## OrCAD

For more information about using **OrCAD**, see **Manual File**, "**OrCAD**" in the Driver Diskette **#2**.

## Personal CAD (PCAD)

For more information about using **Personal CAD (PCAD)**, see **Manual File**, "**Personal CAD (PCAD)**" in the Driver Diskette **#2**.

## Ventura Publisher

For more information about using **Ventura Publisher**, see **Manual File**, "**Ventura Publisher**" in the Driver Diskette **#2**.

## VERSACAD 386

For more information about using **VERSACAD 386**, see **Manual File**, "**VERSACAD 386**" in the Driver Diskette **#2**.

## Microsoft Word

For more information about using **Microsoft Word**, see **Manual File**, "**Microsoft Word**" in the Driver Diskette **#2**.

## WordPerfect 5.X

For more information about using **WordPerfect 5.X**, see **Manual File**, "**WordPerfect 5.X**" in the Driver Diskette **#2**.

## WordStar

For more information about using **WordStar**, see **Manual File**, "**WordStar**" in the Driver Diskette **#2**.

## OS/2 2.0

For more information about using **OS/2 2.0**, see **Manual File**, "**OS/2 2.0**" in the Driver Diskette **#2**.

# APPENDIX: Technical information

## A. Monitor connector pin assignments

| Pin Number | Function |
|---|---|
| 1 | Red Video |
| 2 | Green Video |
| 3 | Blue Video |
| 4 | (No Connection) |
| 5 | ground |
| 6 | Red Return (ground) |
| 7 | Green Return (ground) |
| 8 | Blue Return (ground) |
| 9 | (No connection) |
| 10 | Sync Return (ground) |
| 11 | (No Connection) |
| 12 | (No Connection) |
| 13 | Horizontal Sync |
| 14 | Vertical Sync |
| 15 | (No Connection) |

## B. Video Feature Connector Pinout

| Pin | Name | Function |
|---|---|---|
| 1 | PD0 | DAC pixel data bit 0 |
| 2 | PD1 | DAC pixel data bit 1 |
| 3 | PD2 | DAC pixel data bit 2 |
| 4 | PD3 | DAC pixel data bit 3 |
| 5 | PD4 | DAC pixel data bit 4 |
| 6 | PD5 | DAC pixel data bit 5 |
| 7 | PD6 | DAC pixel data bit 6 |
| 8 | PD7 | DAC pixel data bit 7 |
| 9 | - | DAC Clock |
| 10 | - | DAC Blanking |
| 11 | - | Horizontal Sync |
| 12 | - | Vertical Sync |
| 13 | - | Ground |

| Pin | Name | Function |
|---|---|---|
| 14 | - | Ground |
| 15 | - | Ground |
| 16 | - | Ground |
| 17 | - | Select Internal Video |
| 18 | - | Select Internal Syncs |
| 19 | - | Select Internal Dot Clock |
| 20 | - | Not used |
| 21 | - | Ground |
| 22 | - | Ground |
| 23 | - | Ground |
| 24 | - | Ground |
| 25 | - | Not used |
| 26 | - | Not used |

## C. Troubleshooting

The instructions which follow are applicable to users.
If you have problems after installation, check the following to determine the cause.
a. Ensure that all cables are properly connected, and that all plugs are firmly seated in their sockets. Check to see if the VGA card is firmly seated in its bus expansion slot. Be sure it is not making contact with any other cards in the system.
b. Ensure that the display monitor is properly connected to computer. Be sure the display monitor and your system's power supply is operating properly (i.e. Fan operates, system power light comes on). Power OFF the computer system and all other connected devices before checking the following conditions.
c. Ensure that the system motherboard switches/jumper(s) are set properly for use with the VGA board.
d. Ensure that no other switch settings on the motherboard have been accidentally changed. Refer to the documentation provided with your computer to determine the correct switch settings.
f. Be sure the **CLMODE.EXE** setting match your monitor frequency.
If checking these items does not locate the problem, there may be a malfunction of the computer system, display monitor or the VGA board. Consult your computer dealer for assistance in locating the problem.

# D. VGA, SVGA, and Enhanced VGA Mode Table

| Resolution | Color | Type | Char Cell | Mode | VESA Mode |
|---|---|---|---|---|---|
| 1. 40X25 | 16 | TEXT | 9X16 | 0 | --- |
| 2. 40X25 | 16 | TEXT | 9X16 | 1 | --- |
| 3. 80X25 | 16 | TEXT | 9X16 | 2 | --- |
| 4. 80X25 | 16 | TEXT | 9X16 | 3 | --- |
| 5. 320X200 | 4 | GRAPH | 8X8 | 4 | --- |
| 6. 320X200 | 4 | GRAPH | 8X8 | 5 | --- |
| 7. 640X200 | 2 | GRAPH | 8X8 | 6 | --- |
| 8. 80X25 | MONO | GRAPH | 9X16 | 7 | --- |
| 9. 320X200 | 16 | GRAPH | 8X8 | D | --- |
| 10. 640X200 | 16 | GRAPH | 8X14 | E | --- |
| 11. 640X350 | MONO | GRAPH | 8X14 | F | --- |
| 12. 640X350 | 16 | GRAPH | 8X14 | 10 | --- |
| 13. 640X480 | 2 | GRAPH | 8X16 | 11 | --- |
| 14. 640X480 | 16 | GRAPH | 8X16 | 12 | --- |
| 15. 320X200 | 256 | GRAPH | 8X8 | 13 | --- |
| 16. 132X25 | 16 | TEXT | 8X16 | 14 | --- |
| 17. 132X43 | 16 | TEXT | 8X8 | 54 | 10A |
| 18. 132X25 | 16 | TEXT | 8X14 | 55 | 109 |
| 19. 800X600 | 16 | GRAPH | 8X16 | 58 | 102 |
| 20. 800X600 | 256 | GRAPH | 8X16 | 5C | 103 |
| 21. 1024X768 | 16 | GRAPH | 8X16 | 5D | 104 |
| 22. 640X480 | 256 | GRAPH | 8X16 | 5F | 101 |
| 23.1024X768 | 256 | GRAPH | 8X16 | 60 | 105 |
| 24. 640X480 | 64K | GRAPH | 8X16 | 64 | 111 |
| 25. 800X600 | 64K | GRAPH | 8X16 | 65 | 114 |
| 26. 640X480 | 32K | GRAPH | 8X16 | 66 | 110 |
| 27. 800X600 | 32K | GRAPH | 8X16 | 67 | 113 |
| 28. 800X600 | 16 | GRAPH | 8X16 | 6A | --- |
| 29. 320X200 | 64K | GRAPH | 8X8 | 6F | 10E |
| 30. 320X200 | 16M | GRAPH | 8X8 | 70 | 10F |
| 31. 640X480 | 16M | GRAPH | 8X16 | 71 | 112 |
| 32. 1024X768 | 64K | GRAPH | 8X16 | 74 | 117 |

# Specifications

## System Unit

| | |
|---|---|
| **Video support** | VGA3 Cirrus 5422 |
| **Size** | |
| Length | 14.67 in. |
| Width | 15.75 in. |
| Height | 6.5 in. |
| Weight | Approx. 24.5 lbs. |
| **Power requirements** | 110-125/230-240 V AC |
| **Thermal output** | |
| 109 BTU/hr | 172 BTU/hr. max |
| **Noise level** | 42 dBA |
| **Environment** | |
| Maximum operating altitude | 10, 000 feet |
| **Air temperature** | |
| Operating: | 50°F to 195F (10°C to 35°C) |
| Storage | -40°F to 158°F (-40°C to 70°C) |
| **Humidity** | |
| Operating | 20% to 80% (non-condensing) |
| Storage | 10% to 95% (non-condensing) |

## Diskette Drive

| | |
|---|---|
| **Unformatted capacity** | 2.0MB |
| **Formatted capacity** | 1.44MB |
| **Number of tracks** | 80 per side |
| **Number of heads** | 2 |
| **Average access time** | 95 ms |
| **Track-to-track access time** | 3 ms |
| **Motor starting time** | 500 ms (700 ms max.) |
| **Rotation speed** | 300 rpm |
| **Media** | 3½-inch high-density or standard-density |

**Note:** The 1.44MB diskette drive can read, write, and format standard-density (720KB) diskettes as well as high-density (1.44MB) diskettes. Formatting a 720KB diskette requires special command parameters. See an operating system reference manual.

# Ordering Master Diskettes

On your computer's hard drive is a program for making master diskettes of your hard drive's preloaded programs (MS-DOS 6, Microsoft Windows, and, optionally, Microsoft Works).

Masters of the software can also be obtained by calling our toll-free 800 number. To get current price information or to order your master diskettes, call:

## 1-800-451-9409

**7 a.m.–7 p.m. (Central time)**
**Monday–Friday**

***Please have your model number and serial number available when you call.***

*Major credit cards are accepted.*

*Diskettes will be shipped by First Class Mail within 48 hours of your order.*

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